

Claims

3. 1. An apparatus for the liquid chromatographic separation of substances under pressure, wherein at least several liquid chromatographic separating lines (17), which are disposed in parallel, are supplied by a single pumping unit (one or two pumps) and, in the region, when the samples are supplied, are combined with a sample delivery system (5) and an injection system (18) as well as, in the detection region, with a detector (13), connected with an evaluation and control unit (16).
2. The apparatus of claim 1, wherein the liquid chromatographic separation lines (17) have flow control units (10, 12, 12.1, 19).
3. The apparatus of claims 1 or 2, wherein the flow control units (10, 12, 19) consist of flow regulators (10), a total pressure meter (19) and flow meters (12).
4. The apparatus of claims 1 to 3, wherein the flow regulating units (10, 12, 19) in each separating line (17) can be controlled by software and/or hardware.
5. The apparatus of claims 1 to 4, wherein flow regulators (10) and flow meters (12) are disposed at different places in a separating line (17).
6. The apparatus of claims 1 to 5, wherein flow regulators (10) and flow meters (12) are disposed compactly in one place in the separating line (17).
7. The apparatus of claims 1 to 6, wherein the flow regulator unit (10, 12, 19) is disposed in front of or behind the separating columns (11.1 to 11.8).

8. The apparatus of claims 1 to 5, wherein the total pressure meter (19) is disposed on the output side of the pump (3, 4).

9. The apparatus of one of the claims 1 to 8, wherein the sample holding system (5) is connected with at least several parallel sample holding lines over at least several injection ports (6) and injection valves (9) and sample loops (7) of the multi-parallel injection system (18) are connected with at least several separating columns (11.1 to 11.8), which are coupled with a detector (13), which has several determination channels.

10. The apparatus of one of the claims 1 to 9, wherein the separating columns (11.1 to 11.8) are combined compactly into a battery of separating columns (11).

11. The apparatus of one of the claims 1 to 10, wherein each injection valve (9) is disposed before the separating columns (11.1 to 11.8).

12. The apparatus of one of the claims 1 to 11, wherein each injection valve (9) is constructed as a multiple way valve.

13. The apparatus of one of the claims 1 to 12, wherein each injection valve (9.1 to 9.8) has switching possibilities to an injection port (6), to a sample loop (7), to the pumps (3, 4), to a waste collector (8) and to a separating column (11.1 to 11.8).

14. The apparatus of one of the claims 1 to 13, wherein the separating lines (17.1 to 17.10) have a separating column and a solid phase extraction unit (13), which are coupled with further pumps (21, 22).

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15. The apparatus of claims 14 or 15, wherein the liquid chromatographic separating lines (17.1 to 17.10) have flow control units (10, 12, 19).

16. The apparatus of claims 14 or 15, wherein a multiple way valve, which can be connected with the solid phase extraction unit (23), the multi-parallel fraction output unit (24) and the waste collector (14), is disposed in the end region of the solid phase extraction unit (23).

17. The apparatus of one of the claims 14 to 16, wherein the solid phase extraction units (23) have at least two fractionating columns each.

18. The apparatus of one of the claims 14 to 17, wherein the solid phase extraction units (23) have between 10 and 50 fractionating columns.

19. A method for the liquid chromatographic separation of substances under pressure, wherein several samples, which are to be separated, are supplied simultaneously to at least several separating columns (11) and subsequently detected and selected simultaneously and in parallel.

20. The method of claim 19, wherein the separating lines (17) are calibrated with respect to the retention times by means of a calibration sample and, after the individual retention times have been determined, are adjusted to the same retention time by control with flow regulators (10) on the basis of data from flow meters (12) and initial pressure meters (19).

21. The method of claim 20, wherein the ratio of the total pressure to the volume flow to the respective separating line is used as actual value for indirectly controlling the volume flow.